

ANTHRAX IN CANADA*

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THIS PAPER REVIEWS THE SITUATION of anthrax in Canada as a whole and discusses the particular outbreak of anthrax in buffalo which occurred in the Slave River area of the Northwest Territories last year.

Anthrax was one of the first scourges to be described in ancient Biblical literature; secondly, its description by Koch in 1876 marked the beginning of modern bacteriology; thirdly, when Pasteur immunized against anthrax in 1881, he demonstrated for the first time immunization against disease by means of an attenuated culture of the specific cause of that disease. As early as 1870 preventive vaccination programs played a part in establishing sheep raising as an economic industry in France and thus, indirectly, assisted that nation to recover from the effects of the Franco-Prussian wars.

Anthrax has world-wide distribution. Due to the tenacity of the spore, which has unique properties, anthrax occurs in the tropics, as well as in the polar regions. The anthrax organism can survive for long periods in areas that are subject to periods of extreme heat and prolonged flooding, in low-lying, marshy land, and in soils which are rich in decayed vegetable and animal remains. The organisms possess a high degree of virulence and, when they gain access to the body, they multiply rapidly, invading the blood stream and producing a septicemia. When exposed to adverse conditions in the presence of oxygen, the bacilli form spores which are very resistant to heat, low temperatures, chemical disinfectants and prolonged drying. Considerable evidence has been recorded where spores have retained their viability in soil, water, or on hides for many years.

Anthrax is a reportable disease under the Animal Contagious Diseases Act and all diagnoses are established by Federal authorities. Under our control program herds of domestic animals that are infected with anthrax are quarantined. This procedure is designed to confine the animals to prevent animals in the incubation stage from being sold or moved off the premises. The infected carcass or carcasses, together with all exposed and contaminated material, such as bedding, straw, and manure, are deeply buried or burned. The area where the dead carcasses are buried is fenced off, and the premises are cleaned and disinfected. In addition, in the case of cattle, the Department vaccinates the balance of the herd using an approved, avirulent spore-type vaccine supplied and administered by the Health of Animals Branch. The quarantine remains in effect for sixty days following the vaccination. It is then removed providing there have been no further deaths or sickness, and providing the cleaning and disinfection have been completed. Quarantined herds are kept under observation and periodically checked for any further developments.

In the past 50 years in Canada, a total of 163 outbreaks of the disease have been recorded: British Columbia 6, Alberta 1, Saskatchewan 8, Manitoba 1,

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Ontario 63, Quebec 83, and Prince Edward Island 1. From the foregoing, it is obvious that Ontario and Quebec have experienced a larger percentage of the outbreaks. In these provinces, certain areas have come to be known as "anthrax areas". Years ago, these areas were frequently associated with tanneries, and outbreaks in livestock were caused by animals having access to pastures and water contaminated with affluent soak waters. Since the introduction of regulations some few years ago, the incidence of anthrax associated with tanneries has markedly declined. In the large majority of these outbreaks, only one premises was involved. Anthrax does not spread from animal to animal, but is contracted through exposure to infected soil and materials. In some outbreaks where more than one premises was involved, epidemiology suggested the movement was by biting insects, such as flies and mosquitoes.

Field observations of outbreaks in Prince Edward Island (1953), and in Quebec (1960), indicate infection was transmitted by the horse fly (species *Tabanus*). This species is described as being aquatic or semi-aquatic. In the Quebec outbreak which affected horses particularly, the disease did not spread from neighbour to adjacent neighbour, but rather from one premises to another premises over a fairly wide area, and frequently the spread was noted to follow a water course. Affected animals exhibited swellings along the belly and genital area, temperatures were 103.8° F. and higher, there was a strong and rapid heart beat, and death occurred in one or two days.

In an outbreak in a wild animal park at Moose Jaw (1957), six zoo animals died—a lion, a racoon, a bitch, a bobcat, a civet, and a cougar.

In 1952, an outbreak occurred in Ontario involving two mink ranches. Mortality was 11 per cent and 17 per cent, respectively. The source was attributed to anthrax-infected horse meat. *B. anthracis* was isolated from samples of horse meat, as well as from infected mink. The owner of the horse thought the animal was foundered and had sold it to a local slaughterhouse operator, who, at the time the animal was killed, noted that it had an enlarged spleen and did not bleed out well.

The most recent outbreak of anthrax involving domestic animals occurred in British Columbia in 1962. In this particular case, only two cattle died. However, the history of the source of the disease is interesting. Some 45 years ago, the owner of the premises recalled an outbreak of anthrax in which his losses were very heavy. Since that time and for the last 25 years, the farm had been used for fruit growing and no cattle had been kept; yet conditions were optimum, the anthrax spores became viable, thus causing losses this past spring.

Food-borne anthrax, due to contaminated fodder, hay, and other harvested or prepared foods, is very difficult to trace. In our control program, however, a full investigation is conducted on the epidemiology of the outbreak to establish the source of infection. One of the most serious outbreaks of anthrax in the United States was attributed to an importation of 100 tons of raw bone meal from Belgium in 1952. By August of that year, 330 outbreaks had occurred in 19 States. The total losses included 232 cattle, 381 swine, 79 sheep, 56 mink, and 2 mules. The suspected source of the infection was the contaminated feed.

In the light of this outbreak, the Health of Animals Branch took appropriate

control measures, and, in July, 1952, a Ministerial Order was introduced prohibiting the importation of bone meal, fertilizers containing bone meal, and feeding stuffs for livestock containing bone meal from the United States. This prohibition is still in effect. Canada does import sterilized bone meal from approved premises in the United Kingdom. In addition, of course, regulations restrict the importation of untanned hides and skins. Untanned hides and skins may only be imported into Canada at approved premises. Facilities for adequate disinfection of hides are required, and, at these approved premises, the hides are subjected to approved disinfecting methods and procedures to eliminate anthrax. These procedures rely largely on the use of acid-type disinfectants, such as hydrochloric acid, formic acid, and mercuric acid, and, more recently, sodium bifluoride. These agents at varying strengths and times are employed to eliminate the anthrax spore from the hides.

In July, 1962, deaths occurred in the bison herd at Wood Buffalo Park. This is a large park involving some 17,000 square miles which straddles the Alberta-Northwest Territories border. At the time of the outbreak, it was estimated that there were approximately 10,000 to 12,000 bison in the area. The area in which the losses were first observed was some 60 miles north of Fort Smith. Laboratory examination by the Alberta Veterinary Laboratory and the Department's Hull Laboratory showed the cause of death to be anthrax. Altogether, 281 bison were found dead in a 700-square-mile area between the Slave River in the west and the Talston River in the east. Some 3,000 other bison outside the Preserve at the time of the outbreak were on the west side of the Slave River. Fortunately, during the summer months, the animals on the east side of the Slave River are isolated from the Park and there is little interchange of animals. However, this is not the case in the winter months when the animals can cross the river on the ice.

Officers of the Canadian Wildlife Service who first detected the losses observed animals exhibiting signs of illness. The animals were generally depressed and indifferent; whereas, at that time of the year, they should have been active and alert. They appeared gaunt and drawn. Most of the animals walked with difficulty, staggering at times and exhibiting a stiff-leg gait when running. Swellings of the preputial and umbilical regions were noted in many animals. Cadavers were bloated and dark blood exuded from body openings.

In the early part of August, Dr. A. E. Lewis, District Veterinarian with the Health of Animals Branch, Calgary, Alberta, visited the site and an autopsy showed edematous swellings and bloody discharge from the body openings. There was some degree of rigor mortis in the animal, the spleen was about twice its normal size and hemorrhagic, and other viscera were congested. The lymph glands were described as "brick red" in colour. The blood was dark and failed to clot. The anthrax bacillus was isolated through guinea pig inoculations.

Procedures for the disposal of dead carcasses were immediately undertaken. The field party for this purpose was under the supervision of Dr. Wm. Norton, Federal Veterinarian from Camrose, Alberta. A sizeable area, west of the Slave River, was declared to be a quarantined area under the Animal Contagious Diseases Act prohibiting the movement of bison products out of the area. This

quarantine is to remain in effect for the present season. It was necessary to set up measures of decontaminating clothing and equipment used by persons involved in this operation. (Note: two cases of human involvement were reported; one involving the cutaneous form and the second the pneumonic form.)

An effort was made to move the herd still in the contaminated area to a holding zone and fence them. They were dispersed north and south of the so-called infected zone. Attempts were undertaken to burn off the 700-square-mile area to discourage animals from returning to it. Unfortunately, inclement weather interfered and not more than 15 per cent of the area was burned over. This latter operation was under the supervision of the Northern Administration Branch of the Department of Northern Affairs and National Resources. By November, air observations indicated that a large number of bison had returned to the area from which they had been driven off earlier.

A close aerial surveillance is being maintained over the herd by officers of the Canada Wildlife Service and the Health of Animals Branch. No further losses were detected until June 27, 1963. The losses occurred in the same area as in 1962 and specimen material forwarded to the Animal Pathology Laboratories at Hull, P.Q., ultimately confirmed the presence of anthrax. The burial mounds had not been molested. Practically the entire herd had returned to the "so-called" infected area and flies were numerous in the area. Control measures have again been imposed on the herd. The immediate measures taken were attempts to move the herd back from the infected area together with proper disposal of cadavers found on aerial survey.

The source of the infection in this outbreak has not been established. It is conceivable that the spores were resident in the area for many years, and, due to the low-lying, marshy nature of the area and the flooding in the summer of 1962, the spores were washed to the surface by flooding or via earthworms. Reports of bush horses that have died in the area were traced and, while the cause of death of the horses was not established, it appears that their demise was due to causes other than anthrax.

Field reports indicate that a number of animals did recover. An interesting observation is that the disease did not occur in young animals to the same extent as it did in older animals; only one calf and two yearlings were found dead. From the appearance of the first cadavers observed, it is felt that the outbreak occurred only a few days before its detection. Northern Affairs officers also observed that in some places in the contaminated area the number of dead male animals largely exceeded the number of dead females. This, they explain, is due to the fact that bulls isolated from the herds died at or near favourite wallows in more or less restricted locations.

The outbreak caused considerable concern to the Federal Government. The area is being kept under close observation, and, authorities recognize the potentiality of a recurrence of the disease. Measures to maintain the herd and to prevent the recurrence of losses due to anthrax present some difficult problems. The disposal and burial procedures are adequate but the area is heavily contaminated with anthrax spores. The physical features of fencing off the infected area present tremendous problems. Similarly, the use of vaccines, such as are employed in domestic herds, represents a tremendous undertaking since first

the herd would have to be corralled, or at least adequately confined for a vaccination program. Dispersal of the herd away from the infected area is being actively pursued, and might be the only realistic approach to this problem.

In spite of restrictions and control measures established under the Animal Contagious Diseases Regulations, there is no doubt that sporadic outbreaks will occur. These outbreaks may not necessarily occur in known anthrax districts, and they may occur in any species.

Anthrax in Canada has never reached epizootic proportions. Prompt detection and diagnosis through co-operation of veterinarians and responsible authorities will ensure confinement and control of each and every outbreak.

ABSTRACT

"Primate Diseases Infectious to Man". E. C. Appleby, O. Graham Jones and S. A. Keeble. Vet. Rec. 75: 81. 1963.

The primate diseases transmissible to man which are of most importance are B. virus infection (*Herpes simiae*) shigellosis and salmonellosis; and tuberculosis.

The B. virus infection produces lesions similar to "cold sores" in man, in the oral cavity of monkeys. The monkeys arriving in the autumn are particularly suspects. In man the mortality rate may be as high as 100 per cent producing an ascending myelitis.

Shigellosis and salmonellosis in man acquired from primates is rare especially in laboratory personnel however, a more serious risk appears to exist with pet monkeys which may transmit infection to children. It would be of advantage if both veterinarians and medical practitioners were more aware of this. Import by air might increase the risks to the public.

Tuberculosis in monkeys is reported as 73 per cent human, 26 per cent bovine and 1 per cent avian. Although no reference has been found in the literature to tuberculosis in man arising from infection by a lower primate, several authors have mentioned the possible danger to public health.

Ringworm has been reported in the Bush Baby and a real danger exists in its transfer to man.

Transmission of disease of the primate to man represent considerable hazards because of increased volume and increased speed of importation. Under these circumstances the medical and veterinary professions should collaborate to educate and advise wherever and whenever possible, both within and without the professions.

The unsuitability of the monkey as a pet particularly in households with small children, should be explained to the public. *H.C.R.*

ABSTRACT

"A Case of Lactational Tetany in the Cat and a Review of the Literature". D. C. Lawler. Vet. Rec. 75: 811. 1963.

A case is described of illness in a 14-month-old Siamese cat rearing her second litter of kittens. At four weeks after parturition the cat vomited without signs of previous illness. It then became dull and tended to knuckle over on the forelegs. Upon examination it was found to be thin, dull, in lateral recumbency with the forelegs extended. It showed signs of anterior incoordination when aroused. Response to subcutaneous injection of 5 cc. of 20 per cent calcium borogluconate was good. A summary is given of clinical signs as seen in five previously recorded cases. *C.M.F.*